



COMBINED PARTICLE FILTER AND SELECTIVE CATALYTIC REDUCTION CATALYST FOR DIESEL ENGINES

Study of the Chemical and Physical Mechanisms behind the Function of Silicon Carbide Particle Filters and Loaded Catalysts and Development of New Methods for the Synthesis of Mesoporous Silicon Carbide

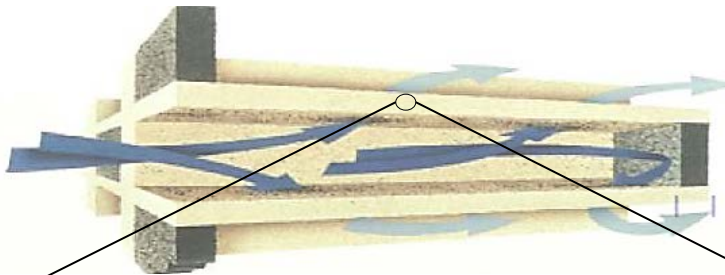
PhD-student Jeanette Hvam*



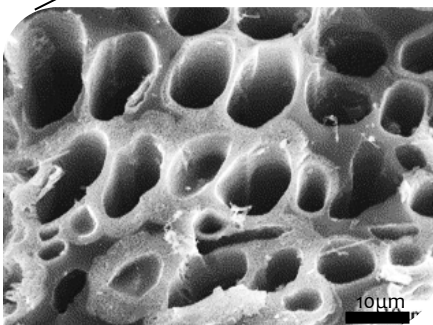
Increasing pollution is a major threat to both human health and the environment. In turn new strict legislations are being applied. By 2016 all Heavy-Duty Diesel Engines in the EU should be equipped with a Diesel Particle Filter, DPF, and a NO_x-reduction system like a Selective Catalytic Reduction catalyst, SCR. This PhD-project is a collaboration between the private company Dinx, producer of exhaust systems, and University of Southern Denmark. The aim for the PhD project is to investigate and develop a solution combining SCR and Particle Filtering in one unit.

Novel Wall-Flow Filters have an efficiency of 95%, but coated with SCR-catalyst, backpressure is increased and the risk of plugging or thermal aging of the catalyst can be a problem. The key issue is to balance porosity versus Catalyst Coating and efficiency. These parameters will be subject to investigation in this Project.

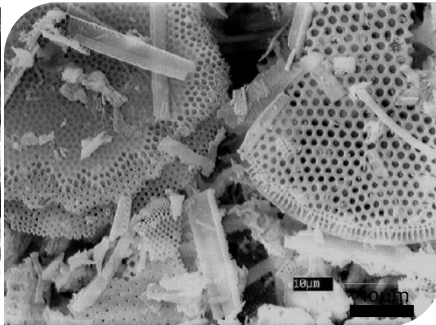
Silicon Carbide is known for its thermal and structural stability and chemical inertness. These properties, among others, qualify SiC as particle filter material as well as support material for SCR catalyst in exhaust systems.



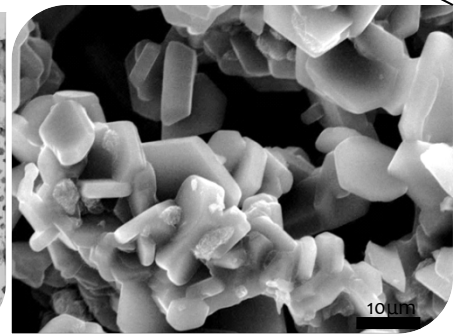
A Silicon Carbide structure with a high surface area is an advantage for both the catalytic reaction and the filter properties. Synthesis methods for preparation of Mesoporous Silicon Carbide will be explored in this Project.



Wood has a natural porous structure and from this one can produce mesoporous Silicon Carbide



Diatomite from fossils is a natural mesoporous source of Silicon for Silicon Carbide.



Novel Silicon Carbide for Diesel Particle Filters and Catalyst Supports are also mesoporous but costly to produce.

References and images

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